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MECHANICS.

246. Proposed by A. M. HARDING, Adjunct Professor, University of Arkansas, Fayetteville, Ark.

A pentagon $ABCDE$, formed of equal uniform heavy rods connected by smooth joints at their ends, is supported symmetrically in a vertical plane with A uppermost, and AB and AE in contact with two smooth pegs in the same horizontal line. Prove that if the pentagon is regular, the pegs must divide AB and AE each in the ratio $1 + \sin(\pi/10) : 3\sin(\pi/10)$. Jeans' *Theoretical Mechanics*, page 112, number 13.

247. Proposed by C. N. SCHMALL, New York City.

A cylinder of height h and radius r is standing on a horizontal seat in a railway car while the train is getting under way with an acceleration f . Show that the cylinder will not be disturbed if

$$f < \mu g, \text{ and } f < 2rg/h,$$

where μ is the coefficient of friction.

NUMBER THEORY AND DIOPHANTINE ANALYSIS.

171. Proposed by PROFESSOR E. B. ESCOTT, Ann Arbor, Mich.

Solve completely:

$$\begin{aligned} 2x^2 - 1 &= y, \\ 2y^2 - 1 &= z, \\ 2z^2 - 1 &= w, \\ 2w^2 - 1 &= x. \end{aligned}$$

172. Proposed by H. C. FEEMSTER, York, Neb.

Show that $\frac{(nr)!}{n!(r!)^n}$ is an integer.

173. Proposed by V. M. SPUNAR, M. and E. E., East Pittsburg, Pa.

Find integral values satisfying the equation,

$$a_1^2 + a_2^2 + a_3^2 + \dots + a_n^2 = d^4.$$

NOTES AND NEWS.

Professor L. E. Dickson, who has been abroad during the past six months, returns to residence at the University of Chicago for the Spring Quarter, beginning April first, 1910. S.

The twenty-sixth regular meeting of the Chicago Section of the American Mathematical Society will be held at the University of Chicago on Friday and Saturday, April 8, 9, 1910, at the Ryerson Physical Laboratory. Arrangements will be made for members present to dine together on Friday evening. S.